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## Measuring Welfare State Performance: Three or Two Worlds of Welfare Capitalism?

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**Luxembourg Income Study Working Paper No. 276**

**MEASURING WELFARE STATE PERFORMANCE:  
THREE OR TWO WORLDS OF  
WELFARE CAPITALISM?**

**Paul de Beer  
Cok Vrooman  
Jean Marie Wildeboer Schut**

**May 2001**

**Measuring Welfare State Performance:  
three or two worlds of welfare capitalism?**

Paul de Beer  
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Social and Cultural Planning Office in the Netherlands  
The Hague, May 2001

## Abstract

This paper examines the well-known classification of welfare regimes by Esping-Andersen (1990). First, the institutional characteristics of eleven welfare states are examined by means of a principal components analysis. This analysis confirms the existence of three types of welfare state, viz. the liberal welfare state (USA, Australia, United Kingdom and Canada), the social-democratic welfare state (Sweden, Denmark, Norway) and the corporatist welfare state (Germany, Belgium, France). The Netherlands, however, turns out to be a hybrid kind of welfare state, somewhere in between the social democratic and the corporatist welfare states.

Next, we examine whether these three types of welfare state correspond to a threefold classification in terms of the traditional protective functions of the welfare state. By using LIS-data from the first half of the 1990s we compare eleven welfare states with respect to the degree of income levelling by the social security and tax system, the rate of inequality of disposable household incomes, the level of social welfare (interpreted as a combination of income level and income equality) and the poverty rate. We find that there is indeed a clear dividing line between the liberal welfare states on the one hand and the social-democratic and corporatist welfare states on the other. The liberal welfare states perform consistently worse on the indicators for income levelling, income (in)equality and poverty, but not with respect to the level of social welfare. There is however no consistent difference in performance between the social-democratic countries and the corporatist countries. There rather seems to be a combined group of continental European countries, existing of both social-democratic and corporatist welfare states and the hybrid Netherlands, that achieve roughly comparable results in terms of income protection by using quite different institutions. Hence, although there are indeed three types of welfare state as far as institutional arrangements are concerned, it is better to discern only two types of welfare state with respect to income (re)distribution, social welfare and poverty.

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## 1. Introduction

Western welfare states came under heavy fire in the 1980s and 1990s. Many of the social and economic problems with which Western European countries were grappling were attributed partially, or even primarily, to the inadequate functioning of the welfare state. Whether it comes to the high unemployment level, low level of labour force participation, sluggish economic growth, high burden of taxation and social security charges or the sizeable national debt for each of these problems an accusing finger was frequently pointed at the welfare state. Whereas the welfare state had come under criticism in the 1970s for its inability to compensate sufficiently for the socially undesirable consequences of the free market, in the 1980s and 1990s it was accused of interfering with the smooth operation of market forces. Put differently, from being a solution to the problems of a modern capitalist society, the welfare state itself increasingly was considered the problem, to which a strengthening of market forces was the obvious solution.

The widespread and indeed often justified criticism of the functioning of the welfare state means, however, that the very reason why the welfare state came into being in the first place is at risk of being lost out of sight. Whatever the shortcomings of the present day welfare state may be, it is also undeniable that a free, unregulated market is subject to all sorts of imperfections. One need only reflect on what a modern society would look like without the institutions and arrangements of the welfare state in order to realize that, had the welfare state not existed, it would have had to be invented after all. A developed modern society without a welfare state is simply inconceivable.

Over the past ten years, the emphasis on the inadequacies of the welfare state has deflected attention from the fulfilment of its traditional protective role. The observation that a high proportion of a country's national income is devoted to social security, or that the distribution of earned income is substantially adjusted, tends to be taken as an indication of the disruptive effect of the welfare state rather than of its success.

This paper focuses on the traditional objectives of the welfare state: protection against loss of income, combatting poverty and limiting social inequality. It has long been known that the extent to which the welfare state fulfils these traditional functions varies widely among the wealthy Western countries. For some researchers this has provided grounds for discerning a number of 'types' of welfare state. In the 1970s, for example, Titmuss distinguished three welfare state models: the residual welfare model, the industrial achievement model and the institutional redistributive model (Titmuss 1974). In the first model the welfare state amounts to no more than a social security net; in the second the welfare state is primarily concerned with the protection of (former) employees; and in

the third the welfare state aims at safeguarding the entire population.

The threefold division made more recently by Esping-Andersen in *The Three Worlds of Welfare Capitalism* (1990) has attracted considerable attention in recent years. Diverging from Titmuss, Esping-Andersen does not base his classification on the traditional protective functions of the welfare state, but on the underlying socio-political relationships and labour market policy. Nevertheless his classification of liberal, corporatist and social-democratic regimes largely corresponds with Titmuss's three welfare state models.

Esping-Andersen's distinction between three welfare state regimes is based on 'ideal types', and only to a limited extent on an empirical analysis of the differences and similarities between the various welfare states. This paper tries to chart the actual differences between welfare states on the basis of Esping-Andersen's criteria. To this end eleven welfare states have been measured in terms of varying aspects. First, we examine the empirical base of Esping-Andersen's typology with respect to the institutional features of the eleven welfare states in the first half of the 1990s. Secondly, we try to establish whether the three types of welfare state correspond to a threefold classification in terms of the traditional protective function of the welfare state with respect to income (re)distribution, social welfare and poverty.

Section 2 concentrates on the first question, the categorization of the welfare states on the basis of their institutional characteristics. In section 3 a number of hypothesis with regard to the outcomes of the protective arrangements of the welfare state are formulated. In sections 4 through 7 these hypothesis are subjected to empirical tests, using data from the Luxembourg Income Study. Section 4 compares the welfare states regarding the extent of levelling of income inequality. Section 5 investigates the outcomes of the redistribution policies in terms of inequality of disposable household incomes. In section 6 the level of average income is also taken into account in order to calculate different measures of social welfare. In section 7 the differences in performance with respect to combatting poverty are considered. In section 8 we give an overall assessment of the social performance of the different welfare states and try to answer the question whether there are really three types of welfare state. Since the results in the preceding sections refer to the situation at the beginning of the 1990s we finish with some reflections on the relevance of the analyses for assessing the present-day welfare state.

This paper is based on our book *On Worlds of Welfare* (Wildeboer Schut et al. 2001), published by the Dutch Social and Cultural Planning Office.

## **2. Three worlds of welfare state capitalism, plus the Netherlands**

This section examines the extent to which countries may indeed be clustered into three types on the basis of the institutional features of their welfare state.

This seeks to provide empirical support for the three Esping-Andersen welfare state types. To this end a principal components analysis has been conducted on 58 institutional characteristics of eleven western welfare states, namely Australia, Belgium, Canada, Denmark, France, Germany, the Netherlands, Norway, Sweden, the United Kingdom and the United States. The choice of these countries is based on their central position in Esping-Andersen's classification, and on the availability of comparative empirical data on income distribution needed for the further analysis in this paper (see below). The institutional characteristics in terms of which the countries have been compared with one another concern the funding of the welfare state (including tax rates and social security contributions), the regulation and structure of the labour market (including the minimum wage, collective agreement coverage rate, labour force participation of women and older people and the share of the service sector in employment), and the level and coverage of the social security provision for old age, surviving dependants, children, disability, unemployment and social assistance.

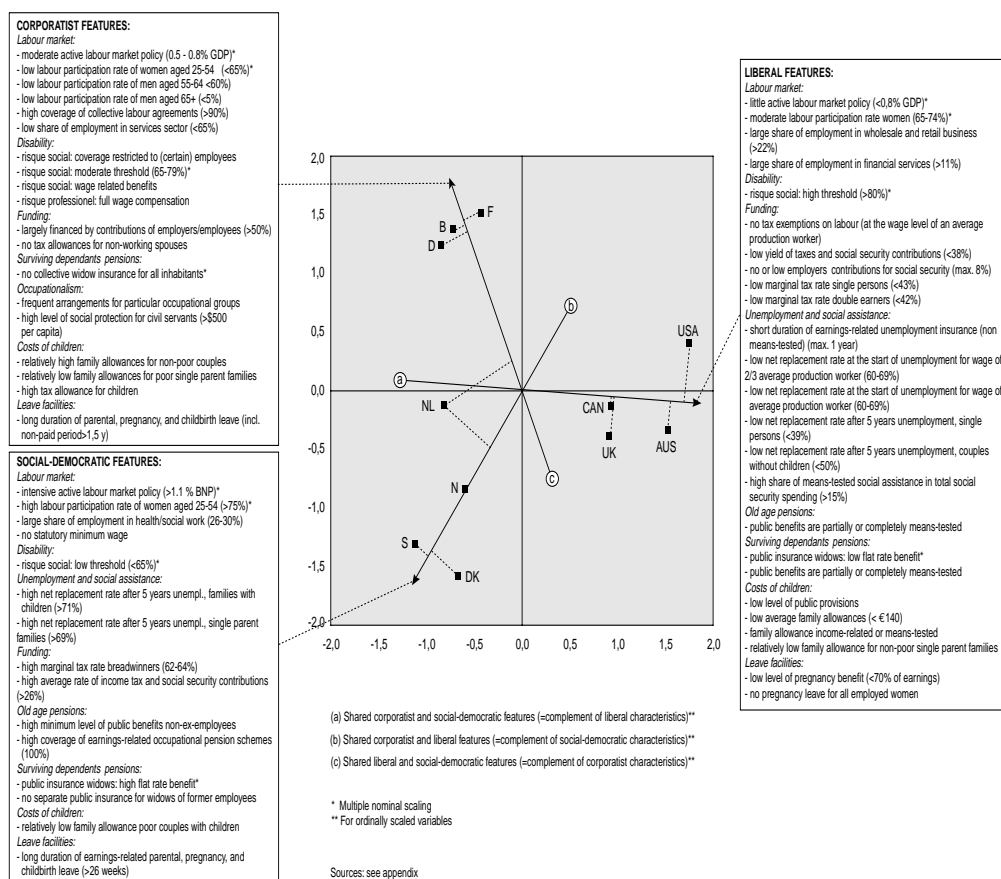
The data used for the empirical institutional analysis are taken from various sources, especially the OECD (1988, 1994a, 1994b, 1995, 1997), the US Department of Health & Human Services (1991), and Bradshaw et al. (1993). They relate to the early 1990s, because the analysis of income distribution and poverty in the remainder of the paper also largely concerns the first half of the 1990s. Moreover, an analysis based on figures from the early 1990s is an updatment of the original (limited) analysis of Esping-Andersen (1990), which related to the early 1980s. The application of the non-linear principal component analysis (Princals or 'principal components analysis by alternating least squares') results in an optimal scaling of both the countries and the institutional characteristics, in which countries that share a lot of characteristics get similar scores on the dimensions, while countries that have not much in common are placed far apart. Figure 1 shows the scaling of both the countries and the institutional characteristics.

In broad terms the analysis of these welfare state characteristics confirms Esping-Andersen's threefold classification, although there are a number of not insignificant differences. Sweden, Denmark and Norway form a cluster of social-democratic welfare states. Within this cluster Sweden turns out to share its position as a country which most closely approximates the ideal-type of a social-democratic welfare state with Denmark. Norway has a less pronounced social-democratic regime. These social-democratic welfare states are characterized by a comprehensive system of social protection. The high level of social services is revealed by, among others, the high replacement rate for unemployed families with children and the relatively high level of the old age and survivors pension schemes. These generous social security benefits result in high average and marginal tax rates. The social-democratic countries also spend large amounts on active labour market policies. The labour force participation of women is high, which is facilitated by generous parental leave schemes.



Germany, Belgium and France form a cluster of corporatist welfare states, which it is not possible to rank in terms of 'purity'. Characteristic for the corporatist welfare states are the generous unemployment and disability insurance schemes for (former) employees. The position of the traditional male breadwinner is also safeguarded by the protective services for children and parenthood, e.g. relatively high child benefits and long-term pregnancy, childbirth and parental leave. In the field of labour relations the collective agreement plays a central role. Both the labour participation of women and of older men is much lower than in the social-democratic countries

Figure 1 Scaling of 11 countries and 58 characteristics of welfare institutions (Principals object and category quantifications)



The United Kingdom, Canada, Australia and the United States form a liberal Anglo-Saxon cluster. As expected, the United States turns out to be the predominant liberal welfare state, followed at a short distance by Australia. The UK and Canada are at a significantly greater distance from the liberal ideal-type, and also share certain institutional characteristics with the social-democratic welfare states. The social security systems of the liberal countries can in many respects be characterized as 'residual'. The replacement rate of most benefits is relatively low and they have a limited duration. Much emphasis is put on means-tested social assistance schemes. A distinguishing feature of the collectively financed social security for the old age is the relatively low flat rate benefit. There are few public facilities for children or parentage. The labour market is hardly regulated at all. Although not many public resources are spent on active labour market policies, the participation rate of women is higher than in the corporatist countries.

Classifying the Netherlands provided Esping-Andersen with some problems. Although he is inclined to consider the Netherlands one of the corporatist countries, he recognizes that it also has some social-democratic features. In a recent publication Esping-Andersen acknowledges the fundamental 'hybrid' character of the Dutch welfare state: "the Netherlands remain a Janus-headed welfare regime, combining both social democratic and conservative attributes" (Esping-Andersen 1999: 88). The foregoing empirical analysis confirms this judgement of the Netherlands as a 'hybrid' welfare state, roughly half-way between the social-democratic and the corporatist type. On the one hand the Netherlands share the typical social-democratic characteristics of high replacement rates and high tax rates and the low degree of selectivity of the social security system. On the other hand, the financing of social insurance out of levies on employers and employees, the low labour force participation of women and older men and the moderate expenses on active labour market policies are consistent with the typical corporatist welfare states.

On the basis of this analysis of institutional characteristics, three welfare state types may therefore indeed be identified, although the Netherlands does not fit into that classification. In the remainder of this paper we will examine whether these three welfare state types also reflect three categories of outcomes with respect to the income protective arrangements of the welfare state.

### **3. Hypotheses and data**

The classification of the eleven welfare states into three clusters plus the Netherlands as a hybrid welfare state has been taken as the point of departure for the empirical analysis in the rest of this paper. Whereas the traditional welfare state functions of income protection and income redistribution play a subordinate role in Esping-Andersen's analysis, we focus on the extent to which his typology is also relevant for these functions. We start by formulating a number of hypotheses, broadly coming down to the supposition that the traditional func-

tions of the welfare state are ‘best’ fulfilled by the social-democratic welfare states and least well by the liberal welfare states, with the corporatist welfare states somewhere in between. The expectation is that within the clusters the countries which approximate the ideal-type most closely will exhibit the most ‘extreme’ scores. In other words, Sweden and Denmark will form one end of the spectrum on the basis of the hypothesis and the United States the other.

The hypotheses tested are:

1. *Redistribution:*

The levelling of the income distribution by means of income transfers through the tax and social security system is the least extensive in the liberal states and the most extensive in the social-democratic states, while the corporatist states occupy an intermediate position.

2. *Income inequality:*

The distribution of disposable household income is most unequal in the liberal states and most equal in the social-democratic states, with the corporatist states following close to, but a little behind the social-democratic states.

3. *Social welfare:*

- a. There is a trade-off between the equality of disposable income and the average income level: the more the distribution of disposable income in a country is equalized, the lower its average income level will be.
- b. In the liberal states the inequality is largest, but the average income level is highest; in the social-democratic states inequality is smallest, but the average income level is much lower; in the corporatist states income inequality is slightly larger than in the social-democratic states, while they have a similar average income level.
- c. The ranking of the countries with respect to social welfare depends on the weight that is attached to the inequality and the level of disposable income respectively. The more weight is attached to the income distribution, the higher the social welfare ranking of the social-democratic welfare states and the lower the ranking of the liberal states will be.

4. *Poverty:*

The poverty level is highest in the liberal states and lowest in the social-democratic states, while the corporatist countries occupy an intermediate position.

Since the Netherlands are not classified in one of the three welfare state types, but are placed in between the social-democratic and the corporatist countries, it is hypothesized that they also occupy a position between the social-democratic and the corporatist countries with respect to the four aspects of income policy that are tested in the next sections.

As is clear from these hypotheses, the attention is confined to the impact of the welfare state on the level and distribution of (disposable) income. Other highly important functions of the welfare state the provision of facilities in the field of health care, care of the elderly, education, housing, child care and so on have been left out of account. Hence, this paper does not pretend to describe the effects of various types of welfare state on all aspects of individual and collective welfare. (The performance of different European welfare states on these other aspects has recently been examined in the report *The Netherlands in a European Perspective* of the Social and Cultural Planning Office.)

Another limitation of this paper is that the differences in outcomes in relation to the distribution of income, income level and poverty are solely related to the welfare state type. Needless to say, these differences are also affected by many other determinants, such as demographic and economic factors (e.g. population size and growth, age structure, state of the economy and sectoral structure). However, given the limited number of eleven countries on which the necessary income data were available, it has not been possible to conduct a (multivariate) analysis taking account of multiple background characteristics.

The empirical analysis of the income effects of various welfare states has been carried out using data from the Luxembourg Income Study (LIS).<sup>1</sup> Most of the analyses were conducted on data from the early 1990s. Data on the mid-1990s were available for only a limited number of countries at the time this research was carried out (Canada, Germany, the Netherlands, Norway, the UK and the US).

The LIS agency seeks to promote the comparability of the data as far as possible. Nevertheless the data of various countries have limitations that inhibit effective comparison. This applies in particular to the data of France, Canada and Sweden, which lack data on social security contributions, while the Swedish database employs a different household definition (treating children aged 18 and over who are living at home as single households). The results for these countries need therefore to be interpreted with some caution.

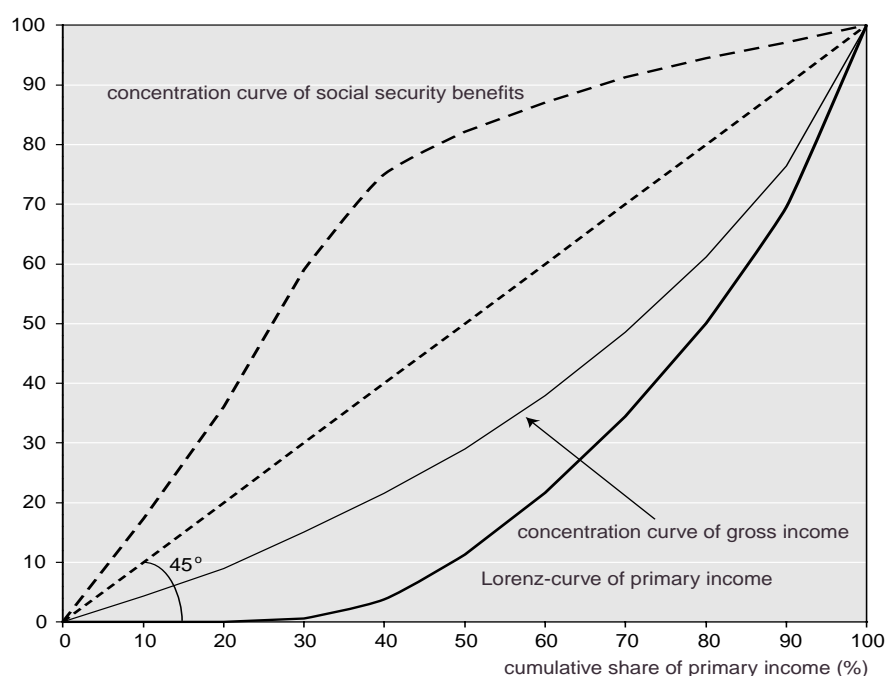
In the case of the Netherlands use was not made of the database forming part of the LIS (SEP, the Socio-Economic Panel of Statistics Netherlands) but of the Income Panel Survey (IPO, again of Statistics Netherlands). This was done because the scale and reliability of the income data provided by the treasury in the IPO guarantee a higher level of precision than the SEP.

The next four sections present the results of the empirical testing of the hypotheses. The results of the analyses are once more reviewed as a whole in section 8 with the aim to arrive at a more general judgement concerning the usefulness of Esping-Andersen's three-fold classification for assessing the extent to which welfare states fulfil their traditional functions.

#### 4. Income redistribution

In a developed welfare state, the income transfers via the system of social security and the tax system go hand in hand with a substantial redistribution of income from higher to lower income groups. A priori one might expect that the social-democratic welfare states would display the greatest income levelling, followed by the Netherlands and the corporatist welfare states, while such levelling would be least pronounced in the liberal welfare states (hypothesis 1).

Figure 2 Lorenz curve of primary (earned) income and concentration curves of social security benefits and gross income, Netherlands, 1996

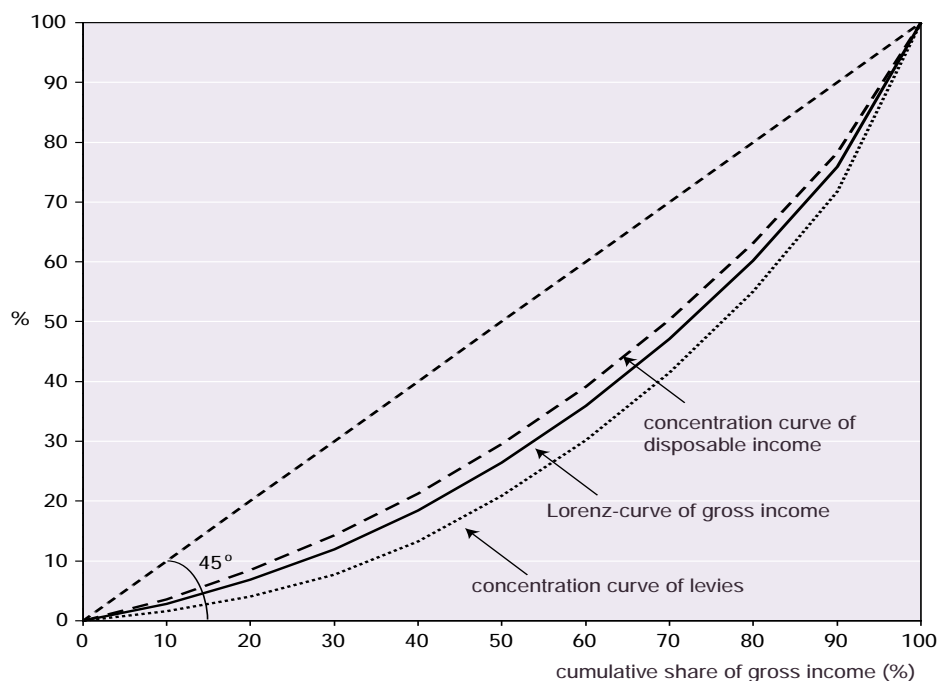


In this section the redistribution of income is analysed in two steps. In the first step the reduction in inequality of earned income by way of the social security system is calculated. In the second step the reduction in inequality of total gross income (including social benefits) by way of the tax system is calculated. Figures 2 and 3 illustrate these two steps in the case of the Netherlands using so-called Lorenz curves and concentration curves (cf. Lambert 1993). The Lorenz curve of earned income in Figure 2 represents the cumulative share in total earned income of the x% of the population with the lowest earned income. The concentration curve of the social security benefits reflects the share of the total

outlays on social benefits that is received by the x% of the population with the lowest earned income. The fact that this curve is everywhere above the diagonal (the 45° line) means that the lower income groups receive a higher share of social benefits than the higher income groups. I.e. social benefits reduce the inequality of the distribution of earned income. This appears from the fact that the concentration curve of gross income, which shows the cumulative share of total gross income of the x% of the population with the lowest earned income, lies above the Lorenz curve of earned income. The area of the segment between the Lorenz curve and the concentration curve of gross income is an indicator of the magnitude of the levelling by the social security system.

Figure 3 shows the redistribution by the tax system and social security contributions. The concentration curve of taxes, i.e. the share of total taxes and social security contributions paid by the x% of the population with the lowest gross income, is below the Lorenz curve of gross income, showing that the Dutch tax system is progressive: the lower income groups pay a smaller part of their gross income in the form of income tax and social security contributions than the higher income groups. The resulting concentration curve of disposable income is therefore closer to the diagonal than the Lorenz-curve of gross income, meaning that taxation also contributes to the levelling of the income distribution.

Figure 3 Lorenz curve of gross income and concentration curve of levies and disposable income, Netherlands, 1996



The size of the income levelling can be measured by means of the Gini coefficient, which is defined as twice the area between the Lorenz curve and the diagonal. The difference between the Gini coefficient of the distribution of earned incomes and the Gini of the distribution of gross incomes measures the extent of levelling by the social security system, while the difference between the Gini coefficient of the distribution of gross incomes and the Gini of the distribution of disposable incomes measures the amount of levelling by taxation. Table 1 shows the results of these calculations.

Table 1 Redistribution of income

	Gini coefficient			reduction of inequality (percentages)		
	earned income	gross income	disposable income	earned → gross income distr.	gross → disposable income distr.	earned → disposable income distr.
Sweden (1992)	0.550	0.343	0.320	38	7	42
Denmark (1992)	0.546	0.369	0.328	32	11	40
Norway (1995)	0.513	0.380	0.334	26	12	35
Netherlands (1996)	0.484	0.335	0.295	31	12	39
Germany (1994)	0.550	0.389	0.319	29	18	42
Belgium (1992)	0.534	0.348	0.291	35	17	46
Canada (1994)	0.509	0.377	0.336	26	11	34
United Kingdom (1995)	0.595	0.423	0.379	29	10	36
Australia (1989)	0.490	0.398	0.347	19	13	29
United States (1994)	0.528	0.430	0.382	19	11	28

Source: LIS, Statistics Netherlands (IPO'96)

In all countries income transfers by the social security system are much more important for the levelling of income disparities than taxation. While the tax system does not reduce the inequality of gross income by more than 18% in any country, the levelling of the differences in earned income by social benefits even amounts to 19% in the least distributive liberal countries, Australia and the United States. In the other countries the disparities in earned income are reduced by at least a quarter by the social security system.

The theoretical expectations, as formulated in the hypothesis with respect to income redistribution, are only partly confirmed by the empirical analysis. Contrary to expectations the list is headed not by social-democratic Sweden or Denmark but by corporatist Belgium and Germany. In Belgium, earned income inequality is reduced by nearly half (46%) by means of taxation and social security, and in Germany by 42%. In general there seems to be no systematic difference between the social-democratic and the corporatist welfare states. However, it should be noted that the degree of income redistribution via taxation and social security is probably underestimated in the case of Sweden, as no figures are available for the social security contributions.

In line with the hypothesis, in the liberal welfare states the income differentials

are reduced the least by social security and taxation for example by no more than 28% in the United States. In this regard, however, the United Kingdom, with a levelling of 36%, bears more resemblance to a corporatist or social-democratic than to a liberal welfare state.

The fact that the anticipated distinction between the social-democratic and corporatist countries does not turn out to exist must primarily be explained by the major influence of the size of social security spending on the extent of income redistribution (see Annex 1). On account of the passive nature of the corporatist welfare states, many households in these countries are dependent on benefits. In addition, the ageing of the population affects the size of social security spending. The extent to which social security benefits accrue in particular to households with the lowest earned income does not, however, vary substantially between the various countries.

The income redistribution by means of taxation and social security contributions is of less significance, so that differences between the countries with respect to the average tax burden and the progressiveness of the levies are of little account for the total levelling of income disparities.

## **5. Income inequality**

The principal hypothesis tested in the analysis of income inequality is that social-democratic welfare states are the least unequal, followed at a short distance by the corporatist group, while the income differentials are widest in the liberal welfare states (hypothesis 2).

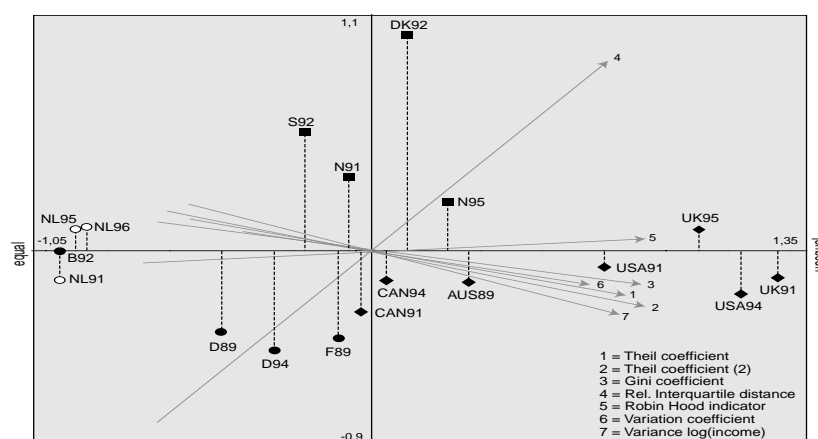
A complication in testing this hypothesis is that there are many ways of measuring income inequality. Different inequality measures do not necessarily result in the same ordering of countries, since they are sensitive to different segments of the income distribution. E.g. the so-called Theil coefficient is most sensitive for changes in the tails of the income distribution, while the well-known Gini coefficient reacts more strongly to changes in the middle income range. As Jenkins (1991) remarks: "All inequality measures, even ones related to apparently objective diagrams, inevitably involve value judgments of various kinds, and (...) some of these implicit assumptions are not necessarily desirable." To overcome the dilemma between either making an arbitrary choice out of the many available inequality measures or overburdening the reader with a lavish amount of inequality figures, we have chosen a middle course by summarizing the results of seven different inequality measures. The summary statistics are calculated by means of an analysis of correspondence (Anacor) of a cross table of the seven inequality measures and eighteen observations (for six countries two or more observations are used: apart from an observation around 1990 also observations from the middle of the 1990s). The seven inequality measures used are the Gini coefficient, the relative inter quartile distance, the coefficient of variation, the variance of log income, the Theil 1 and 2 coefficients and the Robin Hood indicator. These coefficients are defined in Annex 2. The Anacor analysis



results in a figure with two dimensions in which countries and inequality measures that have a lot in common are placed close to each other. The first dimension of the figure (the x-axis) can be interpreted as a general indicator for the equality or inequality of the income distribution in the respective countries. The second dimension (the y-axis) shows whether some specific measures result in a diverging ranking for some particular countries. Annex 3 gives the scores of the countries on the original inequality measures.

The inequality measures are calculated on the basis of two kinds of income distribution. The first is the original unadjusted distribution of disposable household income, as has already been used with respect to the Gini coefficient in Table 1. A serious drawback is that this distribution does not tell us much about the comparative welfare of households. For this reason, in comparing household incomes adjustments are often made for differences in size and composition. This is usually done by calculating so-called equivalence scales, which convert household incomes into the 'equivalent' income of a single person. A number of methods, both normative and empirical, can be used for determining these equivalence scales (cf. Buhmann et al. 1988). In this paper the (modified) OECD equivalence scale is used. This scale attaches a weight of 1 to the first adult person in a household, a weight of 0.5 to all other adults and a weight of 0.3 to each child. The standardized household income is then calculated by dividing the (unstandardized) household income by the sum of these weights. Subsequently this standardized household income is attributed to every member of the household in order to get the disposable household income per equivalent adult.

Figure 4 Inequality in disposable household income (non-standardised)<sup>a</sup>



a Correspondence analysis across seven inequality indicators and 11 countries, various years.

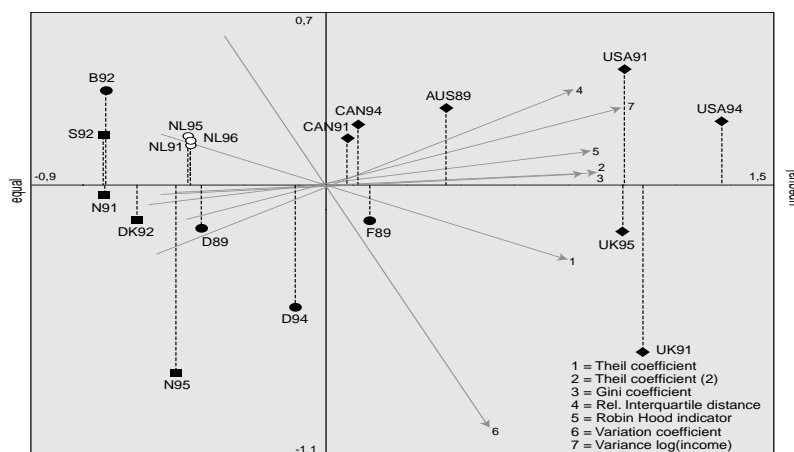
Source: LIS; CBS (IPO'91, '95, '96)

a Correspondence analysis across seven inequality indicators and 11 countries, various years.

Figure 4 shows the results of the analysis of correspondence of the seven inequality measures for the unstandardized distribution of disposable income, in which no adjustments are made for differences in household size. As indicated above, the x-axis can be interpreted as the general dimension of the different inequality measures. The y-axis turns out to be dominated by the inter quartile distance, which gives a ranking that diverges from the other inequality measures, especially in the case of Denmark and Sweden.

The hypothesis that the social-democratic countries are the most equal, is not confirmed with respect to the unstandardized income distribution. The Netherlands and Belgium turn out to display the least inequality, and the United Kingdom and the United States the most. In between there is a broad middle group, in which the moderate relative inequality of the Scandinavian countries is at variance with the expectation. The high inequality in the United Kingdom is also not consistent with the assumptions on the basis of the empirical country typology.

Figure 5 Inequality in disposable household income, after apportionment to individuals (standardised)<sup>a</sup>



a Correspondence analysis across seven inequality indicators and 11 countries, various years.

Source: LIS; CBS (IPO'91, '95, '96)

After standardizing for differences in household size, and assigning this standardized income to all household members, the hypothesis obtains more support (Figure 5). In this case the Scandinavian countries belong to the least unequal group, Germany and France find themselves in the middle and the Anglo-Saxon countries are the most unequal. As a hybrid welfare state, the Netherlands, as expected, finds itself in between the Scandinavian cluster on the one hand and

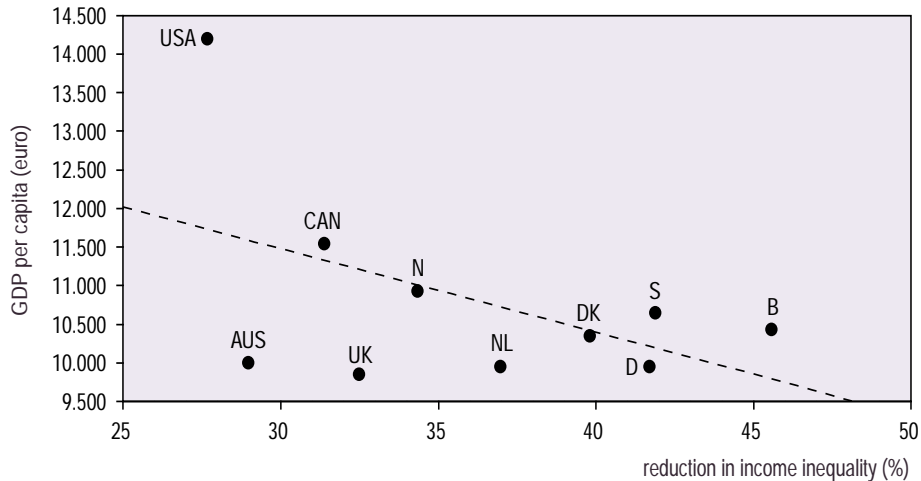
Germany and France on the other. Belgium is the most important exception to the expected picture, being the least unequal. Therefore Belgium does not fit into the expected corporatist pattern. The expectations regarding the ranking within the clusters of countries are not confirmed, even after standardization and assignment. Within the group of social-democratic welfare states Norway turns out to be no more unequal than Sweden and Denmark when starting from comparable baselines (1991/92). Also, there are wide variations within the corporatist welfare states. In fact only Germany finds itself in the expected position within the ranking in terms of inequality, fairly close to the Scandinavian countries. As noted, the lack of inequality places Belgium totally outside the expected pattern while the income inequality in France is so pronounced as to tend towards that of the Anglo-Saxon countries. There is also a wide spread within the group of liberal welfare states. Canada is the least unequal, the United States the most and Australia is in between. Although inequality declined to some extent in the United Kingdom during the 1990s and the UK scores less extremely after standardization and assignment than in the unstandardized distribution, the income contrasts are much greater than one would have expected on the basis of the welfare state characteristics. This can partially be explained by trends during the last two decades. In the 1980s the income differentials in this country widened significantly more than elsewhere. In the early 1980s the income inequality in the United Kingdom, when compared with the other liberal welfare states, was more in line with the theoretical expectation (cf. Gottschalk and Smeeding 1998).

## 6. Social welfare

The ‘appreciation’ of a welfare state is determined not just by the extent to which it reduces social inequality but also by the consequences this has for the material level of welfare. In the most extreme case, the equalization of all income differentials could result in everyone being equally poor instead of equally rich. In this section the hypothesis is tested that there is a negative correlation (trade-off) between the extent of income inequality and the average level of income, and that the various types of welfare state may be divided into clusters in this regard (hypothesis 3).

The idea of a trade-off between equality and efficiency is among the most pervasive in neo-classical economics (cf. Okun 1975). A levelling of income disparities reduces financial incentives and consequently leads to a reduction of labour supply and worker effort, which ultimately results in lower production and less economic growth. Hence, a lower level of average real income is the price one has to pay for a levelling of incomes. Although recently the existence of this trade-off between equality and efficiency has been challenged, both on theoretical and on empirical grounds (cf. Atkinson 1999: 28-35, Perotti 1996, Aghion et al. 1999), the idea that a reduction of income inequality exerts a negative influence on the general welfare level is still dominant among the economic profession.

Figure 6 Inequality reduction and income level (GDP per capita), circa 1990

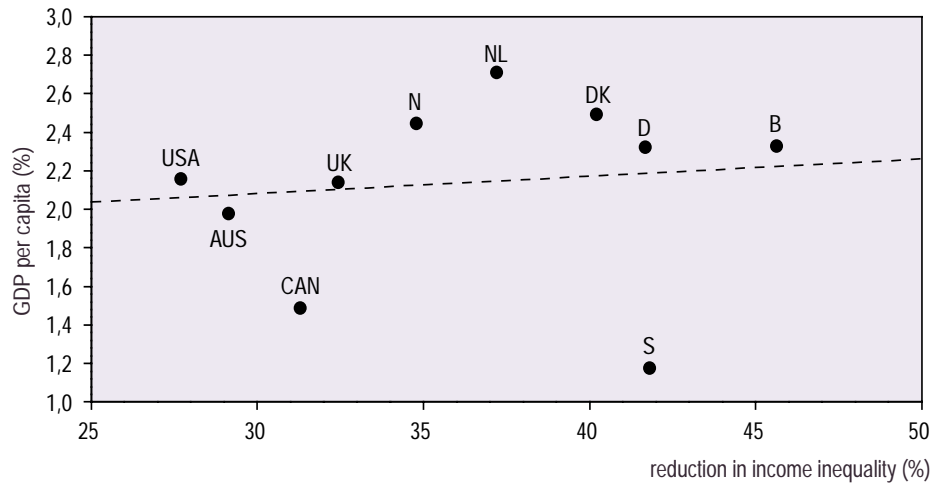


The existence of a trade-off between income equality and income level seems to be confirmed by Figure 6, which shows the relation between the reduction of income inequality by the arrangements of the welfare state and the welfare level. The former is calculated as the relative difference between the Gini coefficients of the distribution of gross income and the distribution of disposable income. The indicator for the welfare level is gross domestic product (GDP) per capita, calculated in so-called purchasing power parities, which is generally regarded as the best method to compare the wealth of different countries.

The liberal welfare states Canada and the United States reduce the inequality of gross incomes the least, but generally have a higher level of GDP per capita than the more equalized social-democratic and corporatist welfare states. The United Kingdom and Australia do not, however, fit into this picture: they combine a low degree of income levelling with a GDP per capita that is no higher than that in the corporatist welfare states. The correlation between the levelling of incomes and the level of GDP is -0.48, but it does not differ significantly from zero.

The link between income equalization and economic performance disappears entirely if one focuses on the rate of economic growth per head of the population. Figure 7 shows the relation between the reduction of income inequality and the average rate of real economic growth in the period 1985-1997. It turns out that there is even a small, though not statistically significant positive correlation ( $r=0.28$ ) between the levelling of incomes and the rate of economic growth. Social-democratic and corporatist welfare states such as Denmark, Norway and Germany and the hybrid Netherlands, which are among the most redistributive welfare states, realized a higher rate of economic growth per capita than the less redistributive liberal welfare states. Sweden is an exception to this rule: in terms of economic growth it performed by far the worst in the period 1985-1997.

Figure 7 Inequality reduction around 1990 and annual economic growth (GDP) 1985-1997



The appreciation of the various combinations of income inequality and income level depends ultimately on normative judgments regarding the importance of both aspects. Two extreme views one could adhere to are the maximean and the maximin option. Maximean means that one only attaches importance to the average level of income, irrespective of the degree of income inequality. Maximin is the value judgment advocated in John Rawls' famous book *A theory of justice* (in which it is called the 'difference principle', by the way; cf. Rawls 1971). It implies that only the level of the lowest income group matters for the evaluation of social welfare.<sup>2</sup>

The maximean option can be interpreted as the result of the absence of any aversion towards income differences, while the maximin option is an expression of extreme (one could say infinite) inequality aversion. Atkinson (1970) has shown that one can define a class of utility functions which are characterized by the inequality aversion parameter  $\alpha$ , that ranges from zero to infinite inequality aversion. This parameter  $\alpha$  can also be interpreted as the size of the 'leak' in the well-known leaky bucket metaphor of Okun (cf. Okun 1975: 91-95). Because of the trade-off between equality and efficiency, an income transfer from a person with a high income to a person with a low income can be compared to carrying water in a leaky bucket: part of the income one tries to transfer is spilled on the way from the tax-payer to the benefit recipient. Suppose one wants to increase the income of a poor person (or household) by 1 Euro by means of an income transfer. If one finds it acceptable that, in order to achieve this result, one has to tap an amount of  $q$  Euro from a tax-payer who earns  $p$  times as many as the benefit-recipient (so the relative size of the leak is  $(q-1)/q$ ), then the inequality aversion parameter  $\alpha$  is equal to  $\ln q / \ln p$ .

Now, if one defines social welfare as the sum of individual utilities, it is possible to compare different combinations of income inequality and average income level by calculating the so-called equally distributed equivalent income (edei). In the hypothetical case that everyone would receive the same income, the edei is the (average) income level that would result in the same level of social welfare as the actual income distribution and income level. The ratio of the edei to the actual average income level therefore indicates the proportion of the average income level one would be prepared to sacrifice in order to level the income distribution completely. Given the distribution and level of income, the greater the inequality aversion, the lower the level of the edei will be.

Table 2 shows the level of the edei for the eleven countries for different values of the inequality aversion parameter. If inequality aversion is zero the maximean option applies, which means that the edei is equal to the actual average income level. In this case the liberal welfare states are relatively high up the league table of social welfare, with the United States and Canada in first and second place. However, Australia and the United Kingdom perform much worse with a shared eighth and tenth place respectively. If one attaches increasingly more importance to income differentials, i.e. the degree of inequality aversion rises, the liberal welfare states sink in the ranking and the social-democratic welfare states, as well as the Netherlands and Belgium, move up. Nevertheless, as the inequality aversion reaches a value of two, it is Canada that takes the lead. But as the degree of inequality aversion increases even further, initially Norway and ultimately the Netherlands occupies first place in the table.<sup>3</sup>

Table 2 The equally distributed equivalent income (edei) for different degrees of inequality aversion (in euros of 1990), 1989-1992

degree of inequality aversion	Sweden (1992)	Denmark (1992)	Norway (1991)	Netherlands (1991)	Germany (1989)	Belgium (1992)	France (1989)	Canada (1991)	UK (1991)	Australia (1989)	US (1991)
0	11,563	13,412	13,912	12,786	14,091	11,219	13,136	16,925	13,170	13,526	18,031
0.5	11,019	12,739	13,253	12,204	13,278	10,756	12,251	15,793	11,886	12,491	16,380
1	10,470	12,122	12,625	11,665	12,541	10,305	11,403	14,697	10,810	11,516	14,750
2	9,286	10,892	11,355	10,648	11,066	9,394	9,809	12,490	9,017	9,662	11,558
3	7,932	9,514	9,946	9,537	9,407	8,345	8,014	10,134	7,525	7,785	8,548
4	6,548	7,917	8,391	7,942	7,622	6,960	5,997	7,791	6,175	5,852	6,036
$\infty$	441	556	578	584	527	501	461	548	411	445	440

Source: LIS, Statistics Netherlands (IPO'91)

The position in the table of typical corporatist welfare states such as Germany and France is not strongly correlated with the degree of inequality aversion. These countries are therefore not designated as the 'best' in respect of any single preference concerning the trade-off between income inequality and level of income, but are also never designated as the worst. In Sweden the average level of income is so low that the country remains at the bottom of the list, despite the relatively small income differentials. The same applies to the United King-

dom, but then particularly because the income inequality is extremely large and the average level of income moderate. Apart from the UK and Sweden therefore the hypothesis is confirmed that social welfare is greatest in the liberal welfare states if one has little aversion towards income inequality, and greatest in the social-democratic welfare states if inequality aversion is more pronounced.

## 7. Poverty

Poverty could be called an ‘essentially contested concept’, since there is an abundance of poverty definitions and measures. Some even dispute the usefulness of talking about poverty in the developed welfare states that are discussed in this paper. Nevertheless, gradually there has grown some consensus that even in rich welfare states a substantial proportion of the population is deprived of essential resources to lead a ‘decent life’, considering the standards that apply in these countries.

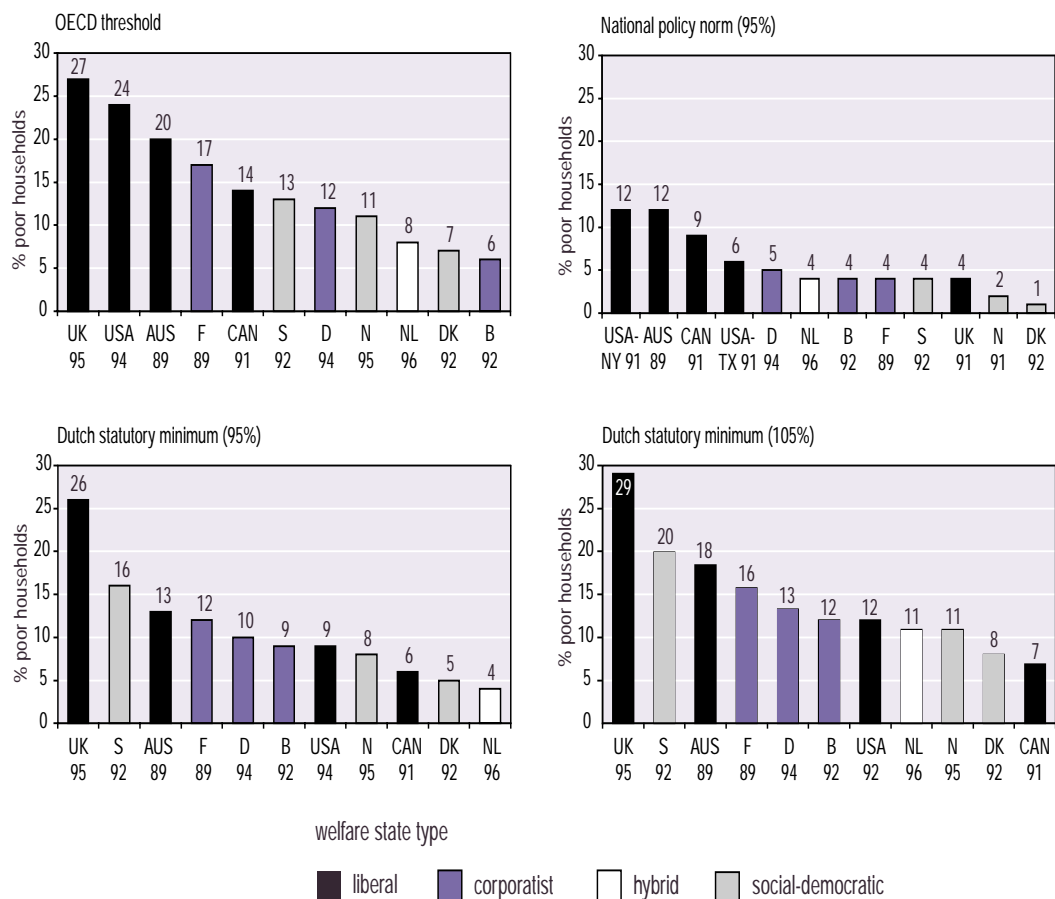
Because of the disagreement about the ‘right’ way to measure poverty, three poverty measures are used in this section. All measures are so-called head count measures, which only calculate the proportion of the population below a predetermined poverty line, but which pay no attention to the intensity of poverty (i.e. the average income deficit of the poor compared to the poverty line) or the income distribution among the poor (see Sen 1981 for a discussion of these alternative poverty measures). The first measure utilizes the internationally commonly used OECD poverty threshold, which is equal to half of average disposable household income. This is a purely relative poverty measure, which bypasses the ‘absolute core’ of poverty - falling below the income level at which the customary needs in society are met. Therefore the OECD poverty measure should in fact be considered a specific measure of income inequality, focusing on the bottom half of the income distribution.

The second measure is an absolute poverty measure, in the sense that it applies the same real income level (in purchasing power parities) to all countries. As a reference level the levels of the Dutch social security or statutory minimum are used as poverty line. (The Dutch statutory minimum amounts to about 1,400 Euro for a couple with to children.) Since a large part of the social security claimants in the Netherlands receive a social benefit that is exactly equal to the statutory minimum, it matters quite a lot whether or not one includes these households into the number of poor. For this reason two calculations are presented for both a poverty line at 95% and at 105% of the statutory minimum: the former includes only households below the Dutch statutory minimum and the latter also households on (or slightly above) the statutory minimum.

The third poverty measure that is used in this section could be called a policy poverty line. It is based on the policy norms for the minimum ‘acceptable’ income that applies in each of the eleven countries separately. In order to count only the households below the poverty line, the actual line is drawn at 95% of the policy norms.

Figure 8 shows the poverty rate in the eleven countries for the four different poverty lines discussed above.

Figure 8 Poverty rate in 11 countries on the basis of the OECD threshold, the national policy norms and the Dutch statutory minimum income



On the basis of the OECD poverty line (half of average income) there is a dividing line between the liberal group on the one hand (with the exception of Canada), and the social-democratic and corporatist countries on the other. In the United Kingdom, the United States and Australia 20 to 27% of the population receives less than half the average income, in France, Germany, Norway and Sweden, but also in Canada this is only 10 to 12%. In Belgium, Denmark and the Netherlands less than one in every ten households is considered poor according to the OECD poverty line. These results correspond closely with the ranking of countries in terms of inequality, which comes as no surprise since the OECD poverty measure, as mentioned before, is in fact a special kind of inequality measure.



If the levels of the Dutch social security or statutory minimum are used as poverty line, the clear distinction between the liberal welfare states on the one hand and the social-democratic and corporatist welfare states on the other hand disappears. Now Canada and, to a lesser extent, the United States also turn out to have relatively low poverty rates. This is due in particular to the high average level of income in these countries, meaning that the Dutch poverty threshold is relatively low below the OECD norm when projected against their income distribution.

If the poverty line is drawn at 95% of the Dutch statutory minimum the poverty level is the lowest in the Netherlands: only 4% of the population falls below the official minimum income level. Denmark, Canada, Norway, Germany, Belgium and the United States now all have a poverty rate of 10% or less. The number of poor is surprisingly high in Sweden (16%), but this is probably due to the divergent Swedish household definition, which considers young adults who still live with their parents as separate - and often quite poor - households. Apart from this, the high Swedish poverty level is presumably also related to the unfavourable economic situation and the relatively sharp increase in the number of benefit claimants in this country during the early 1990s. However, by far the highest poverty level is found in the United Kingdom where one in every four households finds itself below the Dutch statutory minimum.

If the poverty line is raised to 105% of the Dutch statutory minimum, the poverty rate increases of course in all countries. This rise is by far the largest in the Netherlands (from 4% to 11%), since all households that receive a minimum benefit are now considered poor. As a consequence the Netherlands fall to a shared third place, while Canada and Denmark take the lead.

If the policy norms of the countries themselves are used as poverty threshold, the picture is reasonably consistent with Esping-Andersen's typology. This is in line with the expectation: this poverty line measures more than inequality and is not biased by the differences in wealth between the countries, whereas this does apply in the case of the Dutch statutory minimum. Poverty is now the lowest in the social-democratic countries and the highest in the liberal countries, with the corporatist countries and the Netherlands in between. The 'official' poverty rate in the United Kingdom is however surprisingly low, due to the very low social assistance level in the UK.

## **8. Two or three worlds of welfare state capitalism?**

From the results in the preceding sections it will be evident that the three types of welfare state distinguished by Esping-Andersen only partially represent three types of income protection and income distribution. The only country exhibiting the expected picture in almost all respects is the United States: of the countries investigated the US's score in the field of income inequality, income levelling and poverty remains one of the lowest. Only if the average level of income also

plays a role (in the case of social welfare and poverty in an absolute sense) does the US move off the bottom. The other countries can be less readily classified. Often a country combines a high score in one field with a low score in other respects. This is illustrated in Table 3, which summarizes the main findings of this paper.

Table 3 Ranking<sup>a</sup> of the eleven countries investigated in four different areas, circa 1990

Ranking on basis of institutional characteristics	redistribution	equality		social welfare			lack of poverty		
	% egalization	unstandard-ized	standardized <sup>b</sup>	inequality aversion of 0	inequality aversion of 2	inequality aversion of ∞	OECD-threshold	national policy norm	95% Dutch statutory minimum
1/2. Sweden	2/3	4	1-3	10	10	9	6	3-7	10
Denmark	4	8	4	6	5	3	2	1	2
3. Norway	7	6	1-3	4	3	2	4	2	4
4. Netherlands	5	1/2	5	9	6	1	3	3-7	1
5/6/7. Germany	2/3	3	6	3	4	5	5	8	7
Belgium	1	1/2	1-3	11	9	6	1	3-7	5/6
France	.	5	8	8	7	7	8	3-7	8
8/9. Canada	8	7	7	2	1	4	7	10	3
United Kingdom	6	11	11	7	11	11	11	3-7	11
10. Australia	9	9	9	5	8	8	9	11	9
11. United States	10	10	10	1	2	10	10	9/11 <sup>c</sup>	5/6

<sup>a</sup> 1 is the highest and 11 the lowest place in the list.

<sup>b</sup> The modified OECD equivalence scale was used to standardize disposable income.

<sup>c</sup> The first figure relates to Texas, the second to New York.

Source: LIS, Statistics Netherlands (IPO'91)

In the first column the 11 countries have been ranked by type of welfare state, starting with the two countries that most closely approximate the ideal-type of social-democratic welfare state, namely Sweden and Denmark, and ending with the 'archetype' of a liberal welfare state, the United States. The next columns show the ranking of the countries in the fields of income protection and income redistribution. Number one is the country that performs 'best', i.e. which reduces the earned income differentials the most, has the least inequality and has the highest social welfare or the lowest poverty. Number 11 is the country which scores the 'worst' in terms of these criteria.

In order to keep the table reasonably comprehensible, no more than three rankings have been included in each field. The redistribution table relates to the percentage difference in inequality between earned and disposable incomes. The degree of inequality relates respectively to the unstandardized disposable house-

hold income and the standardized household income, assigned to individuals. With respect to social welfare three criteria have been used in Table 3, concerning a degree of inequality aversion of 0 (corresponding to the maximean option), 2 (moderate inequality aversion) and infinity (corresponding to the Rawlsian maximin option) respectively.

For the ranking in terms of poverty three of the four criteria used are shown. The first poverty line is the OECD norm of 50% of average disposable income; the second poverty line is 95% of the Dutch statutory minimum; and the third poverty line is based on the national criteria employed in each of the 11 countries examined. A poverty line of 105% of the Dutch minimum is set aside, since - with the exception of the Dutch position - it does not differ much from the poverty line drawn at 95%.

If the various hypotheses with respect to the three types of welfare state were valid, the numbering in each column in the table would rise from top to bottom, i.e. Sweden and Denmark would consistently have the lowest figures (i.e. the highest places) and the US one of the highest figures (i.e. one of the lowest places). As noted this does generally apply to the US in the four areas investigated with the notable exception of social welfare but Sweden and Denmark do not occupy the expected top position in Table 3. With respect to the degree of income redistribution and income inequality Sweden is in the leading group, but in the field of social welfare it is in the bottom half of the list. This is explained in part by the severe recession in Sweden in the early 1990s but also by the fact that children aged 18 and over living at home are regarded as single households in the available database. Denmark scores particularly well in relation to poverty, but is at best below the top group in the field of redistribution, inequality and social welfare.

If the three types of welfare state are compared with the 'hybrid' Netherlands being considered separately

Table 3 does not provide evidence of any systematic difference in performance between the social-democratic and corporatist welfare states. Of the social-democratic welfare states Sweden, as noted, scores relatively well in relation to income redistribution and equality, Denmark in relation to poverty and Norway in relation to social welfare. Within the group of corporatist countries Belgium stands out for the highly levelled income distribution and low relative poverty. In terms of various criteria Germany is in the second rank, especially as regards the (unstandardized) income equality, the degree of income egalization and social welfare. France is often in the middle of the pack and most closely resembles the pattern anticipated of a corporatist country.

Although no clear line can be drawn between the social-democratic and corporatist welfare states in terms of their performance, there is a clear line between these two types and the liberal welfare states. With the exception of social welfare and 'absolute' poverty on the basis of the Dutch statutory minimum, the liberal welfare states are nearly always at the bottom of the table. As soon as

the absolute level of income is taken into account, however, the picture changes. The fact that two of the four liberal countries the United States and Canada have a relatively high level of income means that they score well with respect to social welfare and 'absolute' poverty. If social welfare is measured solely in terms of the average level of income, the US and Canada in fact head the list. But as soon as one assigns a reasonable weight to the inequality of incomes (an equality aversion of two) Canada is at the top and the US occupies a middle position. Even if one takes 95% of the Dutch statutory minimum as the poverty line, Canada and the US are in the top half of the league table. With their relatively low average level of income the United Kingdom and Canada do not, however, differ from the social-democratic and corporatist welfare states. These countries consequently also score poorly with respect to social welfare and absolute poverty.

Since no systematic differences between the social-democratic and corporatist welfare states emerge from the analysis, the Netherlands as a 'hybrid' welfare state is not so much in between these two types as in the midst of a joint group of social-democratic and corporatist welfare states. In relation to most of the criteria the Netherlands is just below the top of the table. Only if a high weight is assigned to average income in measuring social welfare is the Netherlands at the back of the pack. If 95% of the Dutch statutory minimum is taken as the poverty line the Netherlands scores the best of all countries. This is not very surprising since social assistance is intended to provide everyone with a minimum standard of living and to minimize the number of households below that minimum. If the poverty line is increased to 105% of the statutory minimum so that (nearly) all households in the Netherlands dependent on a minimum benefit are regarded as poor, the Netherlands sinks to a shared third place (see Figure 8).

If one compares the various rank orders in Table 3, the ranking of poverty on the basis of the national policy norms corresponds the best with the ranking anticipated on the basis of the institutional characteristics of the various countries. The social-democratic countries head the list while the liberals bring up the rear (with the exception of the United Kingdom), with the corporatist countries in between. This conclusion is unsurprising to the extent that of the criteria used, the national poverty norms are most closely correlated with the institutional characteristics of the various welfare states. Similarly the ranking on the basis of the standardized income inequality differs little from the expectations, with the exception of Belgium, which scores notably well in this regard. The ranking in terms of social welfare corresponds the least with the sequence from social-democratic via corporatist to liberal types. This is explained by the fact that the level of social welfare depends partially on the (average) level of income in the various countries. Since no account has been taken of differences in income level in the classification of the countries by welfare state type it is not surprising that, the more weight is assigned to the level of income, the less the correlation between the ranking of countries and the type of welfare state.

To sum up, this paper provides confirmation of the existence of three types of welfare state, differing from one another in terms of such institutional characteristics as the degree of coverage provided by social security, the level and duration of benefits, the degree of selectivity or universality of social security, active labour market policies, the regulation of the labour market and the delinking of living standards and labour market position (de-commodification). Thus, the classification into three welfare state types which Esping-Andersen based on the situation in the early 1980s, has been empirically validated for the early 1990s.

If the attention is focused on the extent to which the welfare state fulfils the traditional functions in the field of income (re)distribution and combatting poverty in the various countries, this three-fold classification is, however, less satisfactory. Only in respect of the scale of poverty on the basis of the national criteria and the (standardized) income inequality do the social-democratic countries score the best and the liberal countries the worst, with the corporatist countries somewhere in between. The other criteria in terms of which the functioning of the welfare state has been assessed provide far more ground for a simple division into a liberal Anglo-Saxon type and a continental 'European' type. In comparison with the latter countries, the Anglo-Saxon countries are then characterized by limited redistribution via the welfare state, a high level of income inequality and high relative poverty. However, with respect to social welfare two of the Anglo-Saxon countries, Canada and the US, have a relatively high score.

This conclusion is certainly no reason for rejecting Esping-Andersen's typology. As noted earlier Esping-Andersen did not draw up his typology so much with a view to the traditional income-protection and redistributive functions of the welfare state as to the correlation between the welfare state, social stratification and the labour market. This paper, it should be stressed, was not designed to investigate the relevance of Esping-Andersen's typology for these aspects of a modern capitalist society. If one is particularly interested in the extent to which welfare states fulfil the traditional functions of income protection, combatting poverty and reducing income disparities, however, it would be more accurate to speak of two instead of three 'worlds of welfare state capitalism'.

## **9. The welfare state at the start of the 21st century**

The empirical analysis in this paper largely relates to the situation in the early 1990s. This raises the question as to what extent the results presented above are still valid at the start of the 21st century.

In order to obtain some insight into this aspect the performances of the welfare state around 1995 were also investigated in a number of cases. However, the fact that data were not available for both years for all countries means that it is not possible to provide a complete picture of the developments in the first half of the 1990s. Where this comparison is possible, the analyses point to only

limited shifts between around 1990 and 1995. In certain respects the differences between the countries investigated have become smaller. Norway, Germany and the UK have for example moved more towards the middle with regard to income inequality, although the position of the US has become even more extreme. With respect to social welfare the relative position of the Netherlands has improved somewhat while that of Germany and the United Kingdom has deteriorated, primarily on account of differences in the rate of growth of average income. The period under consideration (around five years) is however too short to draw conclusions on this basis concerning structural changes and the relative performance of the various countries. Changes in the first half of the 1990s are partly determined by the downturn in the economy, both the phasing and the severity of which varied from one country to another. The recession in the first half of the 1990s affected Germany and Sweden particularly badly, the former in the aftermath of the reunification with East Germany, and the latter as a result of the loss of the celebrated Swedish model and joining the EU. By contrast, the Netherlands managed to come through the recession comparatively unscathed.

The available data do not permit any statement to be made about the present situation in comparison with that around 1990. Important changes in the arrangements of the welfare state were made in many countries in the 1990s. In the Netherlands, for example, the Sickness Insurance Act was largely privatized, the Disability Insurance Act (WAO) was radically revised, entitlements to surviving dependants' benefits were strictly limited and social assistance was decentralized (van Praag and Uitterhoeve 1999: 41-50). Considerable shifts similarly took place to a greater or lesser extent in other countries, most pronounced perhaps in the United States where the welfare system (the AFDC) was radically revised. Hence, it is conceivable that the performances of various countries with respect to income inequality, poverty and social welfare consequently differ substantially from those of ten years ago.

It is however to be doubted whether the ranking of the countries will have undergone significant changes as a result. From a survey by the OECD (1997) it may be deduced that the rank order of ten countries (largely corresponding with those studied here) with respect to the inequality of disposable income, the poverty rate according to the OECD norm and the size of income transfers to the lowest income group in the mid 1990s differed little from that around 1980.<sup>4</sup> Since important institutional changes took place in the 1980s as well, this suggests that the position a country occupies in relation to other countries is comparatively 'policy resistant'. In other words, a succession of changes to individual arrangements does not appear to alter the structural effects of a particular type of welfare state substantially. Esping-Andersen reached a similar conclusion in more recent publications (Esping-Andersen 1996 and 1999). It seems therefore quite plausible that the present ranking of the eleven welfare states with respect to the four elements of incomes policies will not differ radically from the ranking in Table 3.

## Annex 1 Decomposition of income redistribution via social security and taxation

The two steps of the redistribution of income that were discerned in section 4, from earned incomes to gross incomes and from gross incomes to disposable incomes, can be further decomposed as follows (Lambert 1993: 170-201). The difference between the Gini coefficients of the distribution of earned incomes and of gross incomes is determined by the regressivity of the social benefits and the share of social benefits in total gross income. The regressivity index measures the extent to which the lower income groups profit disproportionately from the social benefits (Lambert 1993: 249-255). Since in the process of transferring income from higher to lower income groups some ‘reshuffling’ of the ranking of the households may occur, which might result in an overestimation of the redistributive impact of the income transfers, one has to add a correction factor. Formally the levelling by the social security system is equal to (cf. Lambert 1993: 185):

$$G_e - G_g = (C_g - G_g) + a * (G_e - C_b) \quad (A1)$$

In this formule  $G_e$  is the Gini coefficient of earned income,  $G_g$  the Gini coefficient of gross income,  $C_g$  the concentration coefficient of gross income,  $C_b$  the concentration coefficient of social benefits and  $a$  the share of social benefits in total gross income. The concentration coefficient is calculated analogous to the Gini coefficient, as twice the area between the concentration curve and the diagonal. The first term captures the effect of reranking.

Likewise the difference between the Gini coefficients of the distribution of gross incomes and of disposable incomes is determined by the progressivity of the tax system and the share of taxes and social security contributions in total disposable income. Progressivity is defined as the extent to which the higher income groups pay a disproportional share of total taxes and social security contributions (Lambert 1993: 175). The formula for the levelling by the tax system then becomes:

$$G_g - G_d = - (C_d - G_d) + b * (C_t - G_g) \quad (A2)$$

$G_g$  is the Gini coefficient of gross income,  $G_d$  the Gini coefficient of disposable income,  $C_d$  the concentration coefficient of disposable income,  $C_t$  the concentration coefficient of taxes and social security contributions and  $b$  the share of taxes and social security contributions in total disposable income. Again, the first term measures the effect of reranking.

Tables A1 and A2 present the results of this decomposition as applied to income redistribution in the eleven countries.

Table A1 Decomposition of the redistribution by the social security system from earned income to gross income<sup>a</sup>

	Gini coefficient		inequality reduction		contribution of		
	earned income	gross income	absolute	in percentages	regressivity of social benefits	share of social benefits in total gross income	reranking
Sweden (1992)	0.550	0.343	0.207	38	0.806	0.331	-0.059
Denmark (1992)	0.546	0.369	0.177	32	0.840	0.250	-0.032
Norway (1995)	0.513	0.380	0.133	26	0.818	0.206	-0.021
Netherlands (1996)	0.484	0.335	0.149	31	0.887	0.249	-0.072
Germany (1994)	0.550	0.389	0.161	29	0.978	0.190	-0.025
Belgium (1992)	0.534	0.348	0.185	35	0.884	0.252	-0.024
Canada (1994)	0.509	0.377	0.133	26	0.859	0.185	-0.026
United Kingdom (1995)	0.595	0.423	0.173	29	0.899	0.218	-0.023
Australia (1989)	0.490	0.398	0.091	19	0.936	0.108	-0.010
United States (1994)	0.528	0.430	0.098	19	0.880	0.137	-0.022

<sup>a</sup> The product of the regressivity index and the share of social benefits plus the reranking factor is equal to the difference between the Gini coefficient of earned incomes and of gross incomes (cf. equation A1). Example: in case of Sweden  $0.806 \times 0.331 - 0.059 = 0.550 - 0.343 = 0.207$ .

Source: LIS, Statistics Netherlands (IPO'96)

Table A2 Decomposition of the redistribution by the tax system from gross income to disposable income<sup>a</sup>

	Gini coefficient		inequality reduction		contribution of		
	gross income	disposable income	absolute	in percentages	progressivity of taxes	share of taxes in total disposable income	reranking
Sweden (1992)	0.343	0.320	0.023	7	0.079	0.335	-0.003
Denmark (1992)	0.369	0.328	0.042	11	0.098	0.497	-0.007
Norway (1995)	0.380	0.334	0.046	12	0.117	0.435	-0.005
Netherlands (1996)	0.335	0.295	0.040	12	0.082	0.565	-0.006
Germany (1994)	0.389	0.319	0.069	18	0.168	0.501	-0.015
Belgium (1992)	0.348	0.291	0.058	17	0.178	0.360	-0.030
Canada (1994)	0.377	0.336	0.040	11	0.177	0.242	-0.002
United Kingdom (1995)	0.423	0.379	0.044	10	0.169	0.318	-0.006
Australia (1989)	0.398	0.347	0.051	13	0.186	0.272	-0.002
United States (1994)	0.430	0.382	0.048	11	0.154	0.326	-0.003

<sup>a</sup> The product of the progressivity index and the share of taxes plus the reranking factor is equal to the difference between the Gini coefficient of gross incomes and of disposable incomes (cf. equation A2). Example: in case of Sweden  $0.079 \times 0.335 - 0.003 = 0.343 - 0.320 = 0.023$ .

Source: LIS, Statistics Netherlands (IPO'96)



## Annex 2 Income inequality indexes

The seven inequality indexes used in section 5 are:

Theil coefficient (1): 
$$\frac{1}{n} \sum_i \frac{x_i}{\mu} \ln\left(\frac{x_i}{\mu}\right)$$

Theil coefficient (2): 
$$\frac{1}{n} \sum_i \ln\left(\frac{\mu}{x_i}\right)$$

Gini coefficient: 
$$\frac{1}{2n^2\mu} \sum_j \sum_i |x_i - x_j|$$

relative inter quartile distance: 
$$\frac{\mu_{3^{rd} \text{ quartile}} - \mu_{2^{nd} \text{ quartile}}}{median}$$

Robin Hood indicator: 
$$\frac{1}{2n\mu} \sum_i |x_i - \mu|$$

coefficient of variation: 
$$\frac{1}{\mu} \left\{ \frac{1}{n} \sum_i (x_i - \mu)^2 \right\}^{1/2}$$

variance of log income: 
$$\frac{1}{n} \sum_i (\ln x_i - g)^2$$

In these formulas the following symbols are used:

$x$  is income;

$n$  is the number of households in the population;

$\mu = \frac{1}{n} \sum_{i=1}^n x_i$  is mean income;

$g = \frac{1}{n} \sum_i \ln x_i$  is the mean of log income.

### Annex 3 Inequality rankings for seven inequality indexes

Tables A3 and A4 present the inequality rankings of 18 observations of the eleven countries with respect to the seven inequality measures used in section 5.

Table A3 Inequality rankings of the unstandardized distribution of disposable household incomes

Theil (1)		Theil (2)		Gini		Rel.inter quart.dist.		Robin Hood		Coeff. of variation		Var. of log income	
B92	0,135	B92	0,144	B92	0,291	NL91	0,370	NL91	0,207	B92	0,538	NL95	0,291
NL91	0,142	NL91	0,144	NL91	0,293	B92	0,379	NL95	0,208	NL95	0,577	NL91	0,292
NL95	0,142	NL95	0,144	NL95	0,294	D89	0,384	B92	0,209	NL96	0,581	NL96	0,296
NL96	0,143	NL96	0,145	NL96	0,295	NL95	0,388	NL96	0,209	NL91	0,583	B92	0,307
S92	0,165	D89	0,175	D89	0,314	D94	0,389	D89	0,223	S92	0,606	D89	0,368
D89	0,171	S92	0,177	D94	0,319	NL96	0,391	D94	0,226	CAN94	0,652	DK92	0,381
N91	0,179	D94	0,182	S92	0,320	F89	0,404	F89	0,235	CAN91	0,653	S92	0,381
D94	0,181	DK92	0,185	N91	0,326	CAN91	0,419	S92	0,236	D89	0,658	D94	0,382
DK92	0,181	N91	0,187	DK92	0,328	CAN94	0,434	N91	0,237	N91	0,661	N91	0,395
CAN91	0,184	F89	0,193	F89	0,332	AUS89	0,450	CAN91	0,238	AUS89	0,680	F89	0,403
CAN94	0,186	CAN91	0,200	CAN91	0,333	N91	0,460	CAN94	0,241	USA91	0,685	N95	0,416
F89	0,190	N95	0,200	N95	0,334	S92	0,465	N95	0,242	DK92	0,692	CAN91	0,441
AUS89	0,200	CAN94	0,203	CAN94	0,336	N95	0,472	DK92	0,244	F89	0,704	CAN94	0,443
N95	0,200	AUS89	0,218	AUS89	0,347	USA91	0,482	AUS89	0,248	D94	0,740	AUS89	0,474
USA91	0,214	USA91	0,243	USA91	0,363	USA94	0,498	USA91	0,262	USA94	0,760	UK95	0,479
USA94	0,243	UK95	0,244	UK95	0,379	UK95	0,506	UK95	0,273	N95	0,819	UK91	0,520
UK95	0,249	UK91	0,259	USA94	0,382	UK91	0,508	UK91	0,276	UK95	0,836	USA91	0,549
UK91	0,264	USA94	0,266	UK91	0,384	DK92	0,517	USA94	0,276	UK91	0,948	USA94	0,582

Table A4 Inequality rankings of the distribution of disposable household income per equivalent adult (standardization according to OECD method)

Theil (1)		Theil (2)		Gini		Rel.inter quart.dist.		Robin Hood		Coeff. of variation		Var. of log income	
B92	0,077	B92	0,079	B92	0,217	N91	0,227	N91	0,150	B92	0,407	N91	0,163
S92	0,081	N91	0,083	N91	0,217	N95	0,229	S92	0,151	S92	0,429	B92	0,164
N91	0,087	S92	0,085	S92	0,217	S92	0,230	DK92	0,153	N91	0,475	DK92	0,177
DK92	0,092	DK92	0,088	DK92	0,221	DK92	0,243	B92	0,154	NL95	0,483	NL95	0,180
NL95	0,096	NL95	0,092	N95	0,227	D89	0,253	N95	0,155	NL96	0,486	S92	0,181
NL91	0,097	NL91	0,093	NL95	0,238	B92	0,261	D89	0,167	NL91	0,489	NL91	0,182
NL96	0,097	NL96	0,093	NL96	0,238	D94	0,268	NL91	0,170	DK92	0,521	NL96	0,183
D89	0,108	N95	0,095	NL91	0,239	NL91	0,281	NL95	0,170	CAN94	0,546	N95	0,183
N95	0,109	D89	0,101	D89	0,240	NL96	0,282	NL96	0,170	D89	0,548	D89	0,198
CAN91	0,127	D94	0,119	D94	0,259	NL95	0,284	D94	0,181	CAN91	0,551	D94	0,235
CAN94	0,128	CAN91	0,130	CAN91	0,273	F89	0,309	CAN91	0,193	AUS89	0,584	F89	0,268
D94	0,130	CAN94	0,132	CAN94	0,275	CAN91	0,316	F89	0,195	F89	0,622	CAN91	0,272
F89	0,139	F89	0,134	F89	0,278	CAN94	0,322	CAN94	0,195	USA91	0,626	CAN94	0,279
AUS89	0,143	AUS89	0,147	AUS89	0,291	AUS89	0,370	AUS89	0,208	D94	0,658	AUS89	0,309
USA91	0,177	UK95	0,184	USA91	0,329	UK91	0,399	USA91	0,234	N95	0,663	UK91	0,353
UK95	0,195	UK91	0,184	UK91	0,330	UK95	0,401	UK91	0,235	USA94	0,702	UK95	0,355
UK91	0,201	USA91	0,193	UK95	0,331	USA91	0,407	UK95	0,236	UK95	0,743	USA91	0,427
USA94	0,204	USA94	0,216	USA94	0,348	USA94	0,428	USA94	0,248	UK91	0,863	USA94	0,459

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## Notes

1. In accordance with the user agreement for the LIS databases, the following applies for the data from the United Kingdom: 'Material from FES is Crown Copyright; has been made available by the Office for National Statistics through the ESRC Data Archive; and has been used by permission. Neither the Office for National Statistics nor the ESRC Data Archive bear any responsibility for the analysis or the interpretation of the data reported here.'
2. With respect to income inequality the maximin option is not the most egalitarian principle since, in fact, it allows any amount of income disparity as long as the level of the minimum income cannot be raised. The most extreme position would therefore be to attach only weight to the extent of income inequality, regardless of the average or minimum income level. A reduction of income inequality would then always be preferred, even if it would result in a lower absolute income of the least well-off. Since this section is concerned with the balancing of income inequality and income level, this extreme egalitarian position is left out of consideration.
3. Because of the limited reliability of the available income data the edei for infinite inequality aversion is not calculated as the minimum income in each database but as the first decile, that is the highest income in the 10% group of poorest households.
4. The correlation between the ranking around 1980 and 1990 with respect to income inequality amounts to 0.88, with respect to poverty to 0.76 and with respect to income transfers to the bottom 30% of the income distribution to 0.66.